Technical Report No. 87-06

Common Parasites and Diseases of Furbearers in Manitoba

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Manitoba
Natural Resources
Wildlife
Biological Services

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ABSTRACT

Described are the commonly encountered and potentially dangerous parasites and diseases of furbearers in Manitoba. It is not a complete listing but a description of only those species that are commonly visible. Each species description includes a physical description, a list of hosts, a description of the life cycle, the dangers to humans and the effects on the furbearing host.

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Parasites and diseases occur in all populations but become most evident during high population periods. Stressed animals have a weakened resistence and frequent contact with other members of the population allows for easy transmission of diseases and parasites.

The following is a summary of common diseases and parasites of Manitoba's furbearers. Some of these are potentially dangerous to man. The most threatening are RABIES, TULAREMIA and a tapeworm called Echinococcus spp.

Precautions should be taken when handling or skinning any animal.

1) Be sure to cover exposed skin, especially any cuts or abrasions.
2) Wear rubber gloves when skinning.
3) Wash hands and skinning area with strong soap after completion.
4) Dispose of carcasses safely and sanitarily.

If disease is suspected the specimen should be turned into your Resources representative. The carcass should be frozen quickly in a tightly sealed plastic bag. On the attached tag please list the following information:

1) Species
2) Age and sex where possible
3) Collector's name and address or means of contact
4) Date caught
5) Location caught.

Additional information which would be helpful and may be included in a letter are:

6) Time from death until time of storing (where possible)

7) Exact location (eg. 2 mi east of The Pas)

8) Habitat (eg. in the water, in open spruce bog)

9) Suspected ailment

10) Behaviour before death (where possible).

ECTOPARASITES

FLEAS

Wingless insects with laterally compressed bodies. Legs are strong and adapted for leaping. They possess biting mouthparts.

HOSTS

-All species of furbearers, but most commonly on fox, coyote and squirrel.

-Most species of fleas are host specific as determined by temperature but will feed briefly on a secondary host (as many trappers can attest to when handling freshly caught foxes and squirrels).

LIFE CYCLE

-Fleas live in the debris and nesting material in the nest or den of the host where it is warm and humid.

-Adults will venture out of the den on the host when temperatures and humidities are suitable, fleas dry out rapidly when exposed to the elements.

-Adults need a blood meal to breed and so feed frequently (daily) on the host.

-Gravid females jump off the host into the nest and lay their eggs.

-About 20 eggs are laid at one time and as many as 400 to 500 can be laid in a month life span.

-Eggs may hatch in 2 to 3 days or over 2 weeks depending on the temperature and humidity.

-The larva (or 1st intermediate stage) looks like a maggot and feeds on the debris and adult feces (semi-digested blood) in the nest.

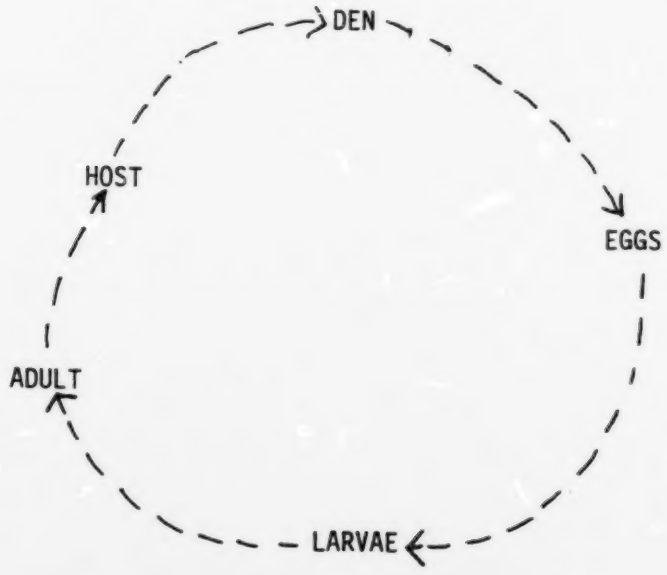
-Duration of the larval stage is again dependent on environmental conditions.

-When conditions are suitable the larva spins a cocoon (or pupates, 2nd intermediate stage).

-It may take 1 to 2 weeks to emerge from this state and become an adult or it may remain dormant over the winter.

-When the adult emerges the cycle begins again.

-Fleas are transmitted between animals on contact or on close proximity where the adult flea (most successful when it is a gravid female) jumps from one host to another.



DANGERS AND EFFECTS

-Fleas can be detrimental to the pelt when they are in high infestations. Rubbing, scratching and secondary bacterial infections can occur with numerous bites and the general condition of the animal is lowered.

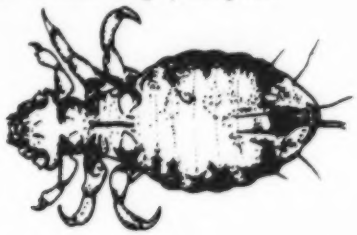
-Fleas are transmitters of tularemia in rodents, myxomatosis in rabbits and the plague in California ground squirrels.

-These diseases can be transmitted to humans via the flea bite therefore care must be taken when handling animals with fleas.

-Fleas can also be intermediate hosts for some tapeworms and transmit them to a new host when swallowed.

MITES

-Small carnivorous arthropods related to the spiders. They feed chiefly on tissue fluids of their hosts which they suck up by means of a sucking pharynx.



HOSTS

-All species of furbearers but commonly associated with mange of fox, coyote and wolves.

-Mites are species specific as determined by temperature.

LIFE CYCLE

-Adults burrow under the skin of the host to lay their eggs.

-The eggs hatch into larvae (1st intermediate stage) and feed off the host's body fluids.

-They grow into nymphs (2nd intermediate stage) which continue to feed off the host.

-Finally they mature into adults who continue to live under the skin.

-The burrowing causes an allergic reaction and irritation of the host's skin.

-To alleviate the itch scratching and rubbing occurs, opening the skin to secondary bacterial infection and causing hair loss and skin lesions.

-Mites are transmitted when animals come into contact with each other and gravid adults are transferred.

DANGERS AND EFFECTS

-Hair loss and lesions caused by the mites is known as mange.

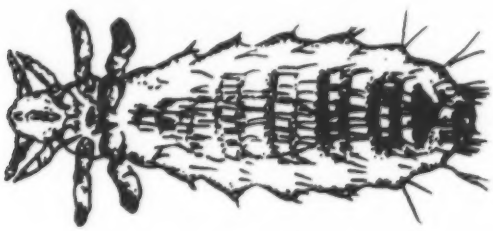
-The hair loss in winter is detrimental to the condition and thermoregulation of the animal.

-The pelt is valueless when the hair falls out and there are bald spots.

-It is possible for man to catch mange if the mites enter his skin.

LICE

-Wingless insects with dorso-ventrally flattened bodies, reduced eyes and sucking or biting mouthparts.



HOSTS

-All furbearers

-They are very species specific and detect very small temperature differences in identifying their host.

-They cannot survive long away from their host.

LIFE CYCLE

-Adults survive on their hosts by eating debris, dried skin and hair or by sucking body fluids.

-Eggs are glued to the hairs of the animal.

-The eggs hatch into a resemblance of the adult except smaller.

-There are no real larval stages, just three nymphal stages.

-The young undergoes 3 nymphal moults as it grows into an adult, beginning the cycle again.

-Transmission is by animal contact and transferrance of lice from body to body as well as from the bedding to body.

DANGERS AND

EFFECTS

-An infestation of lice can cause irritation and scratching and rubbing resulting in secondary bacterial infections, hair loss and lesions.

-The condition of the animal is therefore reduced and the pelt quality decreases with hair loss and soiling by louse feces.

-Lice can transmit diseases as well.

ENDOPARASITES

NASAL WORM (Skrjabingylus spp.)

-A parasitic roundworm which inhabits the nasal sinus.

HOSTS

-Mustelids (Mink, Skunk, Weasel Marten, Fisher).

LIFE CYCLE

-The slender adult roundworms live in the frontal sinuses of their hosts.

-They can create malformations in the nasal cavity.

-The adults produce live larvae.

-From the nasal cavity these larvae are swallowed, pass through the digestive system and are passed out in the feces.

-The larvae enter the snails and slugs on the forest floor.

-These gastropods are in turn eaten by a shrew.

-The final host eats the prey species and gain the infective larva.

-When ingested the larve penetrates the stomach wall, undergoes 2 moults and then the small adult migrates into the gut cavity.

-From there it follows the spinal nerves up the central nervous system where it lies on top of the spinal chord and eventually reaching the top of the brain.

-From the brain it follows the nerves associated with the nose to the frontal sinuses or the hollows on the front part of the snout.

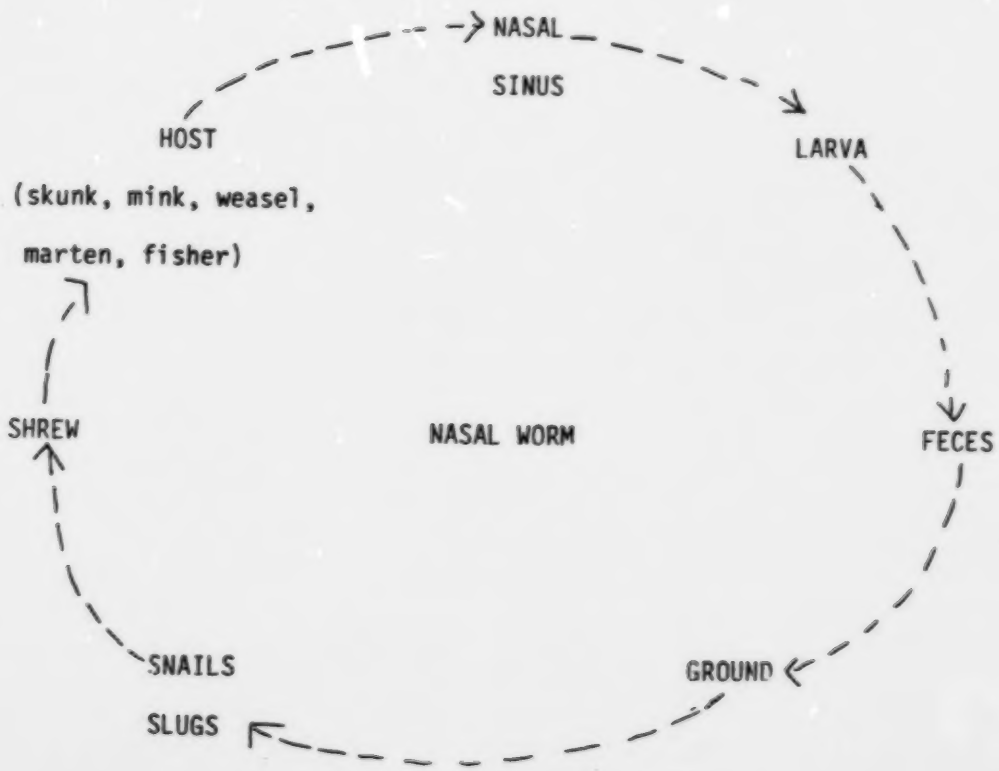
-If the new worm finds the nose crowded it will turn back, destroying the brain on the way.

-Paralysis similar to rabies then occurs.

-The skunk may be a reservoir for this parasite.

EFFECTS

-A sub-acute infection will not alter the animal's behaviour but a heavy infestation will cause discomfort and unusual behaviour as well as brain damage as mentioned.



KIDNEY WORM (Dioctophyma renale)

-Parasitic roundworm, blood red in colour, very large and living in the kidney.

HOSTS

-Wolf, mustelids (mink, fisher, otter).

LIFE CYCLE

-In mink the adult female worms may be 60 cm (24 in) long and 1 cm. (½ in) in diameter but the male worm is much smaller reaching only 30 cm. (12 in) in length.

-In the wolf the worms are much larger, they may be 100 cm. (40 in) in length.

-Adult worms live in the kidney of the host, most often in the right one but have also been found in the abdominal cavity as in otter.

-The adult worm actually eats out the inside of the kidney eventually, leaving just a non-functional hollow sac filled with the worm, fluids, and a hardened bony plate.

-The remaining kidney takes over, increases in size and functions for both.

-If both kidneys become infected, there is sure death.

-While living in the kidney the eggs produced are expelled through the urine of the host to the ground or water where earthworms or their aquatic relatives, oligochaetes, pick them up.

-The worms act as intermediate hosts where the infective larva develops.

-The worm can be eaten by fish, which acts as a reservoir because no more development takes place within it.

-The larva is found in the gut membranes of the fish.
Or the worms can be eaten directly by the final host.

-Mink often get kidney worm by eating frogs.

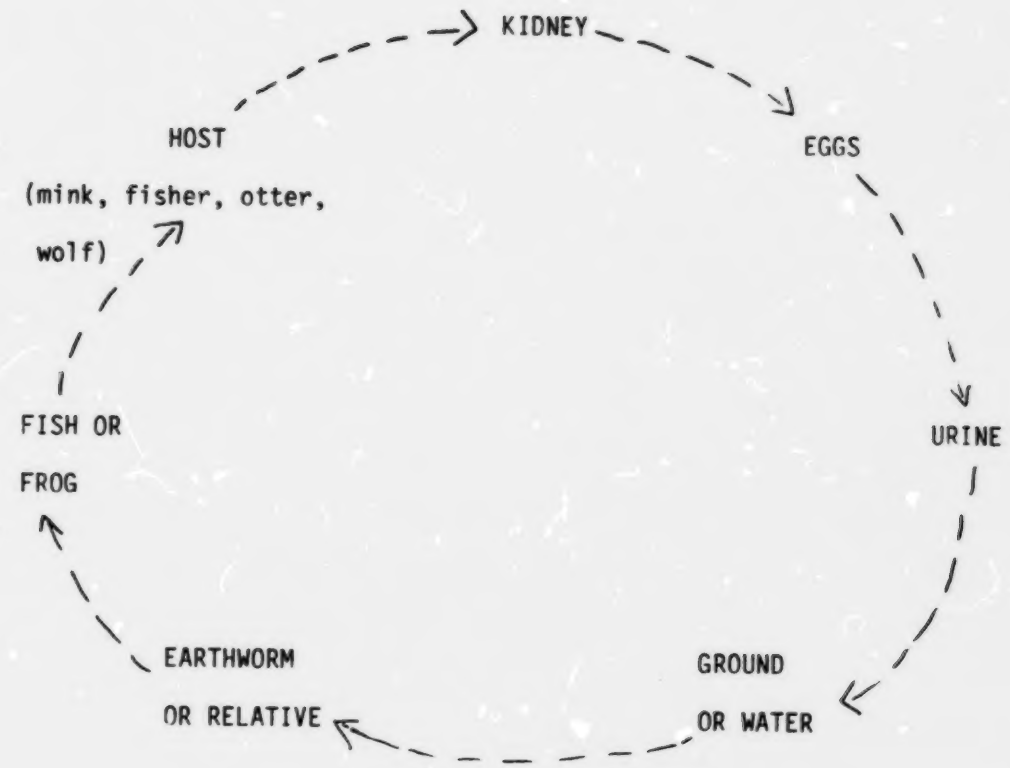
-The frog eats infected aquatic worms which contain the larva, the larva forms a capsule in the legs, body muscles and gut membranes of the frog.

EFFECTS

-The outward effects on the host have not been recorded in the wild but in dogs there is weight loss, frequent urination, nervous trembling and anemia.

-Signs are probably similar for wolves and even the mustelids.

-The kidney worm rarely occurs in man.


KIDNEY
EGGS
URINE
GROUND
OR WATER
EARTHWORM
OR RELATIVE
FISH OR
FROG
HOST
(mink, fisher, otter,
wolf)

GUINEA WORM (*Filaria martes*)

-Parasitic slender roundworms found under the skin and connective tissue in the chest, abdomen and groin of the host.

HOSTS

-Otter, mink.

LIFE CYCLE

-Females are about 11 cm. (4 in) long slender and white, males are darker, very thin and 1 to 4 cm (½ to 1½ in) long.

-Adult worms live under the skin and connective tissue in the chest, abdomen and groin of the host.

-After mating the female migrates to the host's leg where it creates a blister.

-The larvae are released into the blister.

-The blister breaks forming an open sore (ulcer).

-When the host contacts water the larvae escape from the sore.

-The larvae are eaten by *Cyclops*, a hard shelled small aquatic crustacean, in which they live and develop to an infective stage.

-The larvae enter the final host when it eats frogs that have eaten crustaceans or when the host ingests the crustacean when drinking.

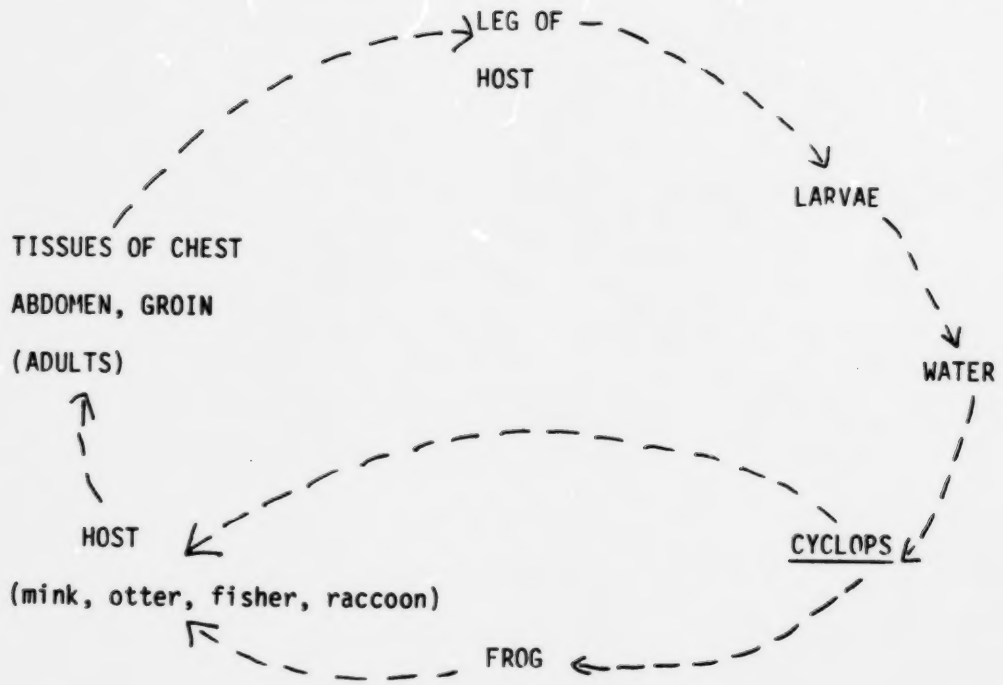
-Once in the host's gut the larvae penetrate the intestinal wall and migrate to the tissue under the skin in the abdominal, chest and groin areas.

-The worms then become mature and mate.

DANGERS AND EFFECTS

-Humans cannot become infected by these worms.

-The ulcers have little effect on pelt quality since they occur on the legs.



HEARTWORM (*Dirofilaria immitis*)

-Parasitic roundworms, white in colour, found in and around the right half of the heart.

HOSTS

-Fox, coyote, wolf.

LIFE CYCLE

-Adult females are 25-30 cm. (12 in) long and males are slightly smaller, 12-16 cm (6-8 in) long. Both are slender and white in colour.

-Adult worms live mainly in the right ventricle of the heart and the pulmonary artery going to the lungs but have been found in other parts of the body.

-They may live for several years.

-The larvae which are called "microfilaria" are released into the blood.

-The larvae are transferred from one animal to another by mosquitoes.

-When a mosquito feeds on an infected animal it picks up the microfilaria.

-The larvae grow in the mosquito's mouthparts until they become infective and are transferred to a new host when bitten.

-Infective larvae travel in the blood for 8-9 months before they settle in the heart, mature and live.

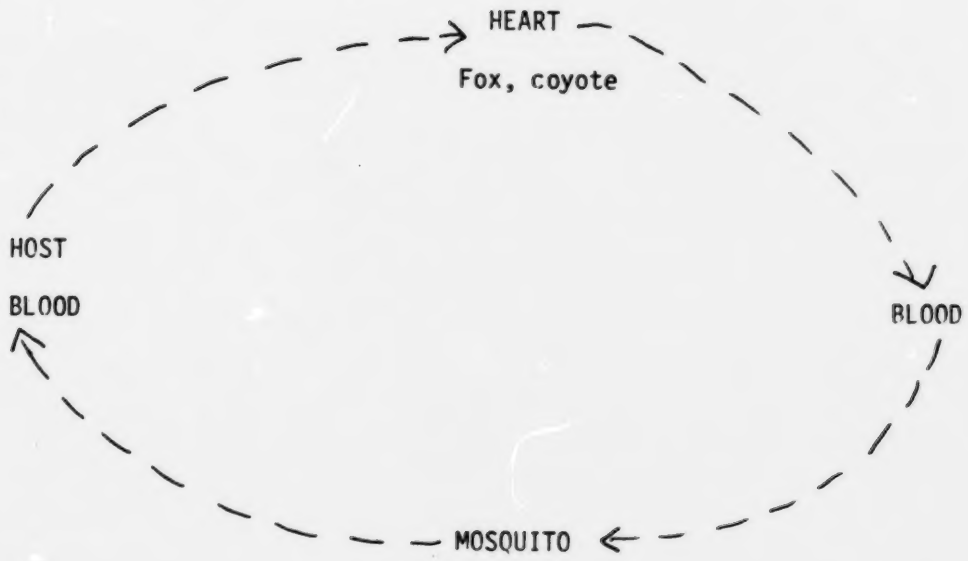
EFFECTS

-In some cases the worms may have no effect on the animal while in other cases may cause death.

-The worms cause blood clots to form which may break away and block arteries and veins.

-The worms may also cause the detrioration of the lungs which allows for the development of pneumonia and finally death.

-Heartworm has never been found in humans.



TAPEWORMS

- Parasitic segmented flatworms living in the intestine of the host.

LIFE CYCLE

- Most species of tapeworms have canids (fox, coyote, wolf) as their final hosts.
- Intermediate hosts include rodents (voles, mice, muskrats) rabbits, hares and cervids (moose, deer, elk).

The general life cycle with species variations goes thusly:

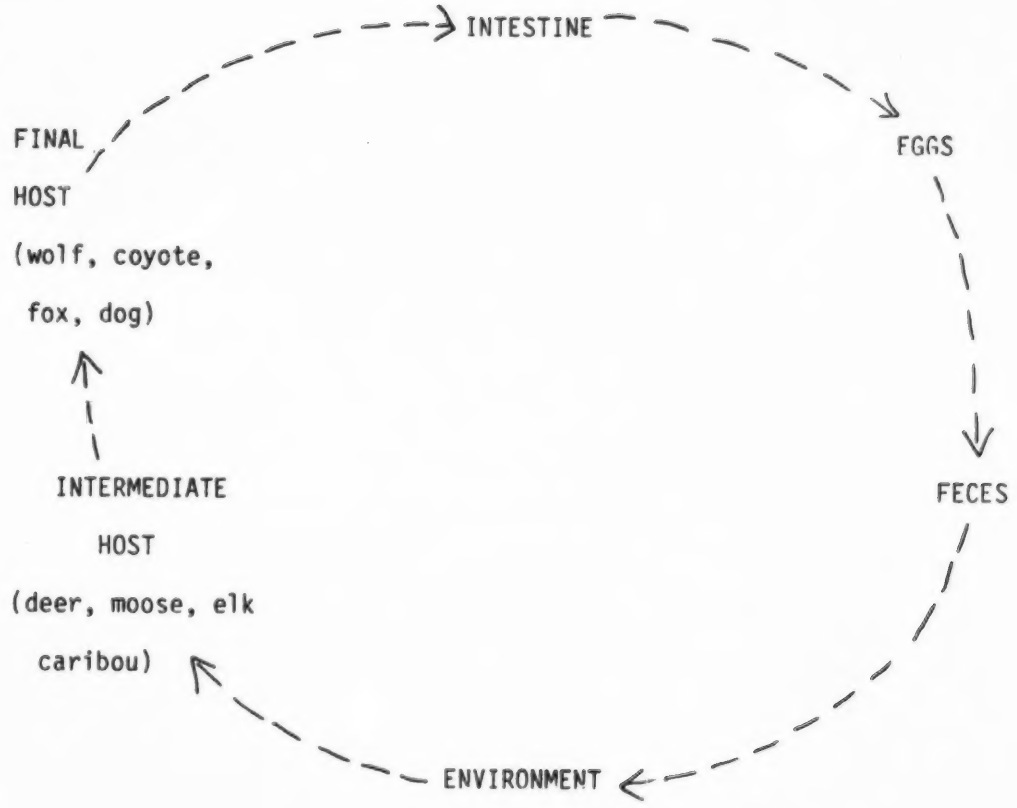
- The adult worm lives in the intestine of the host.
- It is both male and female in the same worm.
- It will either drop a body segment containing eggs or only eggs into the host's feces where they are expelled.
- The eggs of some species are very resistent to the outside environment and can remain infective for months.
- The eggs are usually ingested by the intermediate host when feeding on contaminated vegetation.
- The intermediate stages can have severe effects on these herbivores.
- Many tapeworms have larval stages which have fluid filled bags which often eminate through the viscera of the animal, sometimes swelling the whole body and slowing the prey thus making it easier for the carnivorous predator to catch.
- The predator acquires the tapeworm by feeding on the afflicted prey.

- The larvae becomes adult in the final host's intestine and continues the cycle.
- Adult tapeworms are usually not detrimental to the host unless they are in a high population.
- They can clog the intestines and prevent the absorption of nutrients starving the animal to death.

DANGERS AND EFFECTS

- When skinning care should be taken not to accidently ingest eggs from the anus of the animal.
- Man can act as the intermediate host for some species of tapeworms with potentially severe results.
- One particularly dangerous species is Echinococcus spp.
- The intermediate stage can form a large fluid filled bag within the body cavity and create severe complications.
- Man can also act as a final host for some species with little effect.

Common Species of Tapeworms	Final Host	Intermediate Host
Taenia krabbei	Canids	Cervids
Taenia pisiformis	Canids	Rabbits & Hares
Taenia hydatigena	Wolf	Cervids
Taenia crassiceps	Fox	Voles, Muskrat
Echinococcus granulosus	Wolf, Dog	Cervids
Echinococcus multilocularis	Fox	Voles, Deermice


INTESTINE
EGGS
FECES
ENVIRONMENT
INTERMEDIATE HOST
(deer, moose, elk caribou)
FINAL HOST
(wolf, coyote, fox, dog)

VIRUSES

RABIES

-Acute infectious viral disease of the nervous system.

HOSTS

-Persists in the salivary glands of mainly foxes, skunk and coyote but become evident in wolves and raccoon when there are high population levels.

SIGNS AND PATHOLOGY

-"The atypical is typical".

-When infected, the animal will act unpredictably, and will not exhibit its normal behaviour patterns.

-Average incubation period is usually between 2 and 12 weeks, rarely less than 10 days or more than 6 months.

-There is usually a detectable change in behaviour in 1 to 2 days after infection, where the animal does not eat, is apprehensive OR is more shy and apathetic than usual.

-There are 2 types of rabies, FURIOUS AND DUMB.

-Rabies are transmitted when infected saliva enters the skin through a bite, scratch or open cut.

-The virus moves along the nerves to the central nervous system then to the salivary glands and other tissues.

-With DUMB rabies the animal is rather docile showing partial paralysis of the lower jaw, an inability to swallow and saliva drooling from the mouth (foaming at the mouth).

-The disease progresses into general paralysis then death.

-With FURIOUS rabies the animal first becomes aggressive but eventually succumbs to paralysis.

-An EXCITATION phase occurs 1-6 days after infection, at this time the greatest amount of virus is found in the saliva.

-In skunks especially, the virus may be present for a relatively long period of time before signs are shown.

-The animal becomes restless, vicious and bites sticks or other objects in its path.

-In fox and raccoon, there may be a change in the cry or bark due to the paralysis of the voice box muscles.

-Some eat and drink for the first 2-3 days but usually have difficulty chewing and swallowing.

-Eventually the furious actions subside and the animal becomes much weaker as with dumb rabies.

-It then shows signs of incoordination, muscle tremors, convulsions followed by paralysis and death.

DIAGNOSIS

-Some of the signs of rabies are similar to those of other diseases such as distemper and positive diagnosis cannot be made solely on the outward characteristics.

-The brain must be examined to make positive identification.

-If rabies is suspected the incidence should be reported to the appropriate health officials.

-If possible the animal should be collected with great care, trying not to damage the brain area (ie. don't shoot it in the head) and packaged well in a plastic bag using gloves to handle the specimen.

-The carcass should be kept cool or frozen and taken to the Provincial Veterinary Laboratory and the University of Manitoba, to your Resources representative or to the local veterinarian.

IMMUNITY

-There are anti-rabies vaccines available for pets and for humans who handle potentially rabid animals.

-The human vaccine is usually administered after exposure.

-If exposed to an animal suspected of having rabies, flush the wound with soap and water immediately and see the doctor at once.

DISTEMPER

-An acute or subacute feverish disease of carnivorous species caused by a single virus.

HOSTS

-It occurs mainly in raccoons and mustelids (mink, skunk) and often in canids as well (fox, coyote).

SIGNS

-In the infected fox there is modified dermatitis where the skin on the head is rough and dry.

-The nose is hot and dry, the lips and skin around the eyes is swollen.

-The swollen eyelids and the pus seeping from the tear ducks causes a loss of vision.

-The animal becomes listless, doesn't eat and becomes sicker and weak.

-Diarrhea, unkempt fur, troubled breathing and coughing are also signs.

-Some recover from this stage only to die later barking and undergoing convulsions.

-In normal course the disease progresses into ascending paralysis, uncoordinated locomotion, terminal convulsions, coma, some blindness, lack of fear and other abnormal behaviours similar to rabies.

-The effects of the disease are similar for raccoons except the raccoon becomes more aggressive than do the foxes.

-Skin lesions in the skunk and raccoon occur mainly on the face, chest, limbs, and anal areas.

-The skunk also has blistering on the face, nose and lips.

-Transmission is accomplished by breathing in the virus or coming into contact with the fluids from the eyes and nose or infected urine and feces.

-It is thought blood sucking parasites may also transfer the virus.

-The occurrence of the disease is more widespread when population levels are high and animal to animal contact is more frequent.

PATHOLOGY

-Necropsies have shown pneumonia in the lungs, thickened mucus membranes and enlarged lymph nodes in the diseased animals.

DIAGNOSIS

-Blood tests are needed for positive identification of the disease.

-Because many of the signs are similar to rabies precautions must be taken when trying to identify the signs.

-All animals with these behavioural signs should be treated as rabid for personal and public safety.

BACTERIA

TULAREMIA (Francisella tularensis)

-Acute plague - like feverish bacterial infection.

HOST

-Rabbits, hares and rodents (beaver, muskrat)

-Tularemia can be transferred to man.

SIGNS AND

PATHOLOGY

-Transfer of the bacteria is a 3 or 4 factor complex

-Tularemia can be contracted from a contaminated environment, directly from the animal (carcass) or transferred by parasites such as mite, ticks, lice, fleas, mosquitoes, etc.

-It can also be caught from the droppings of these parasites or the inhalation of the bacterial spores.

-The transfer process may go

Vertebrate host (beaver) → Agent (mite) → Vertebrate host (beaver)

OR

Vertebrate host (muskrat) → Agent (contact, another muskrat) → Vector (flea) → Vertebrate host (muskrat)

-Once the bacteria is in the blood it invades the lining of the blood vessels and the vessels of the lymphatic system.

-Dead cells appear in the spleen, liver, lungs, lymph nodes and bone marrow.

-The bacterial and dead cells from the inner side of the blood vessels enhance the development of blood clots which give rise to the dead areas on the liver, spleen and lymph nodes.

-A diseased animal will have small white dots on the liver, spleen and lungs, these being the dead areas.

-The skin often has blood clots and a plastic consistency.

-In the beaver there are many grey and white pinpoint spots on the liver, spleen, kidney, and lymph nodes associated with the gut.

-There are excessive amounts of fluid in the abdomen, around the lungs and heart.

-There is also bleeding and diarrhea in the intestines.

-In the muskrat there are the blood clots and dead areas on the liver, lungs and spleen as in the beaver.

-There are also dots on the fat beneath the skin.

-There is excessive dark fluids in the body cavity.

-The disease is fatal in beaver, muskrat and small mammals.

-The incidence increases in high population periods when there is increased contact between animals and with the contaminated environment.

-Man can contract this disease by handling a diseased animal or contacting a contaminated environment.

-Tularemia will produce 'flu-like symptoms'.

-The site of entry of the bacterium usually fills with pus and becomes ulcer-like.

-Lymph nodes become swollen and uncomfortable.

-Man usually recovers even when untreated.

-If the disease is identified it is treated with antibiotics.

DIAGNOSIS

-The disease can be positively identified only with lab tests.

PRECAUTIONS

-Extra care should be taken when skinning these animals

-Gloves should be worn and carcasses disposed of safely and sanitarily.

ERRINGTON'S DISEASE (Bacillus piliformis)

(Tyzzer's Disease)

-Is a bacterial disease causing enterocolitis and focal hepatic necrosis.

HOSTS

-Muskrat

SIGNS AND PATHOLOGY

-Errington's disease is transferred by the ingestion of spores from the environment contaminated by feces.

-The bacteria is quite resistant to the environment and can remain infective for 5 years in climates where there are 6 months of -10° temperatures.

-The outcome of the infection depends on the number of spores ingested, infective strength of the organism, resistence and the condition of the animal, diet, age, genetics and presence of other diseases.

-After ingestion the infection spreads up the arteries leading to the liver where it causes lesions in the arteries, liver, caecum and on the small and large intestines.

-There is much intestinal bleeding from the lesions and a collection of fluids in the gut area.

-There are white dead areas on the liver.

-Muskrats dead from this disease will often have food in their stomachs because they cannot digest it.

-Errington's disease is generally a disease of the young but a stressed animal of any age will also contract it.

-This disease can be devastating to an overpopulated and overcrowded muskrat population.

-The crowding causes stress and the contact allows the bacteria to spread rapidly, often wiping out thousands of animals.

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